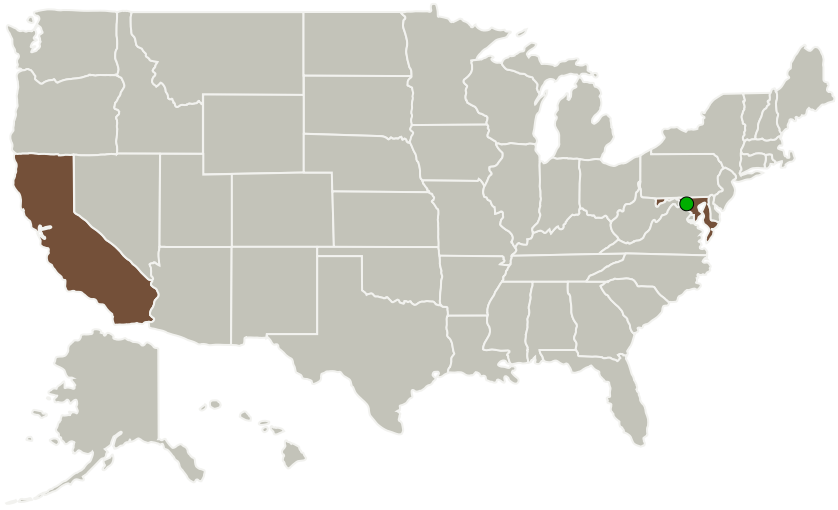
Eyesafe Direct Laser Source for LIDAR, Phase I

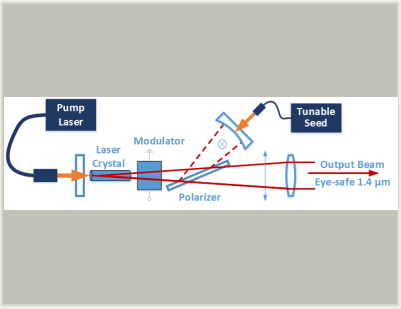
Completed Technology Project (2014 - 2014)

Project Introduction

We propose to demonstrate an eye-safe laser source for a DIAL CO2 sensor that meets or exceeds all topic requirements for a high-pulse-energy laser with good beam quality, transform-limited spectrum, and efficiency >25%. Our approach will use a cavity-dumped resonator to directly generate Nd 1.4-micron pulsed output, and injection seeding for spectral narrowing. This approach, while based on established technology, is innovative in finding an optimal solution from uncommon elements. Our design allows us to start with a well-behaved four-level laser instead of the problematic quasi-three-level lasers like Er:YAG and Er:glass (fiber). Moreover, it avoids the loss in efficiency that comes from using an OPO pumped by the common 1-micron Nd or Yb laser to generate eye-safe near-IR output. We also propose to demonstrate that our laser performance is tolerant of high-temperature operation, making passive cooling possible with major advantages in overall size, weight, wall plug efficiency, and power scalability.

Primary U.S. Work Locations and Key Partners





Eyesafe Direct Laser Source for Lidar Project Image

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Organizations Performing Work	Role	Type	Location
Enlumen Technology, Inc.	Lead Organization	Industry	Mountain View, California
Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
California	Maryland

Project Transitions

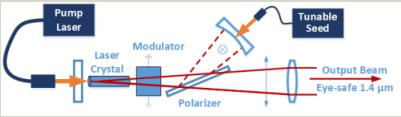
June 2014: Project Start

December 2014: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137478)*

Images



Project Image
Eyesafe Direct Laser Source for Lidar Project Image *(https://techport.nasa.gov/image/131522)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Enlumen Technology, Inc.

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

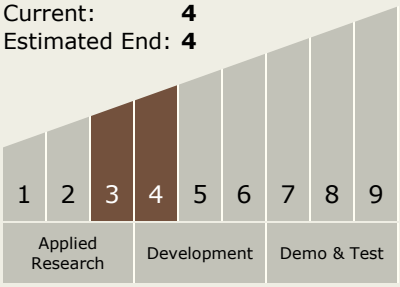
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Lawrence Myers

Technology Maturity (TRL)

Start: **3**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.5 Lasers

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System